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PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

10/518656

16 DEC 2004

REC'D 24 SEP 2004

WIPO

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Applicant's or agent's file reference MR/38024	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/02763	International filing date (day/month/year) 27.06.2003	Priority date (day/month/year) 28.06.2002
International Patent Classification (IPC) or both national classification and IPC E21B43/36		
Applicant ALPHA THAMES LTD		



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 26.01.2004	Date of completion of this report 27.09.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Dantinne, P Telephone No. +31 70 340-3396 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/02763**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-11 as originally filed

Claims, Numbers

1-13 filed with telefax on 06.08.2004

Drawings, Sheets

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

- Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

D1: WO 98/54441 A

D2: WO 99/06891 A

D3: GB 2215408 A

1) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.

1.1) The document D1 discloses:
(Fig. 1,2; Page 9 line 6 - Page 10 line 17)

A method for combatting the formation of emulsions in production fluid, comprising the step of commingling fluid with the production fluid so that the commingled fluid has an oil to water ratio outside a range of oil to water ratios at which emulsions are liable to form.

1.2) The subject-matter of claim 1 therefore differs from this known method in that:

It comprises detecting either (a) a ratio of around 50% oil and 50% water by volume in the production fluid at which emulsions form, or (b) the presence of emulsions in the production fluid.

1.3) The problem to be solved by the present invention may therefore be regarded as to detect the presence of emulsions to improve separation efficiency.

1.4) The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) as the detection of emulsions in a production fluid is disclosed in document D2 (page 3 line 11 - page 4 line 4; page 6 line 8 - 14; page 19 line 7 - 10) in order to solve the same problem. The detection feature described in document D2 provides the same advantages as in the present application. The skilled person would therefore regard it as obvious to include this feature in the

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- method described in document D1 in order to solve the problem posed.
- 2) The same reasoning applies, *mutatis mutandis*, to the subject-matter of the corresponding independent claim 13, which therefore is also considered not inventive.
- 3) Dependant claims 2-12 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to novelty and/or inventive step, the reasons being as follows:

Claim 2: D1 discloses a fraction metre and a controlling operation to maintain the ratio above a certain level.

Claim 3: D1 discloses monitoring of output flows.

Claim 4: Sensors to detect formation of emulsions are known in the art.

Claim 5: D1 discloses adjustment of water being recycled.

Claims 6,7: D1 discloses using recycled water from the separation.

Claims 8,12: D3 discloses a separation step near the wellhead.

Claims 9,10,11: D3 discloses a retrievable module usable in a modular seabed processing system.

CLAIMS:

1. A method for combating the formation of emulsions in production fluid, comprising the steps of:

5 detecting either (a) a ratio of oil to water in the production fluid which is liable to lead to emulsion formation, or (b) the presence of emulsions in the production fluid; and

10 commingling fluid with the production fluid so that the commingled fluid has an oil to water ratio outside a range of oil to water ratios at which emulsions are liable to form.

15 2. The method as claimed in claim 1, wherein the detecting step comprises the steps of measuring the ratio of oil to water in a production fluid, and detecting if the oil to water ratio is inside the range of oil to water ratios at which emulsions are formed.

20 3. The method as claimed in claim 2, wherein the measuring step and subsequent detecting step comprises comparing the volumetric flowrate of oil separated from the production fluid with the volumetric flowrate of water separated from the production fluid.

25 4. The method as claimed in claim 1, wherein the detecting step comprises using a nucleonic level sensor (31) or some other appropriate sensor installed in a suitable vessel (16,16',60,60') to detect the formation of emulsions in the production fluid.

30 5. The method as claimed in any preceding claim, including the additional step of adjusting the amount of fluid to be commingled with the production fluid in response to the detecting step to maintain the commingled fluid so that it has an oil to water ratio outside a range of oil to water ratios at which emulsions are

liable to form.

6. The method as claimed in any preceding claim, including the additional step of separating a fluid from the production fluid, and the commingling step
5 comprising commingling at least a portion of said fluid separated from the production fluid with the production fluid before the production fluid is detected for emulsions.

7. The method as claimed in claim 6, wherein the fluid separated and
10 commingled with the production fluid comprises oil or water.

8. The method as claimed in claim 6 or 7, wherein the separating step takes place at a host facility (2) or at or near at least one wellhead (5).

9. The method as claimed in claim 6, 7 or 8, wherein the separating step
15 takes place in a retrievable module (7) for use with a modular seabed processing system.

10. The method as claimed in any one of claims 6 to 9, wherein both the
20 separating and commingling steps take place in a retrievable module (7) configured for use with a modular seabed processing system.

11. The method as claimed in any one of claims 1 to 9, wherein the
25 commingling step takes place in a retrievable module (7) configured for use with a modular seabed processing system.

12. The method as claimed in any preceding claim, wherein the commingling step takes place at or near at least one wellhead (5).

13. A system for combating the formation of emulsions, comprising:

means (22,24,30;42,48,49) for detecting either (a) a ratio of oil to water in the production fluid which is liable to lead to emulsion formation, or (b) the presence of emulsions in the production fluid; and

5 commingling means (10) for commingling fluid with the production fluid so that the commingled fluid has an oil to water ratio outside the range of oil to water ratios at which emulsions are liable to form.